

IN THE APPLICATION

OF

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FOR A

TWO-WHEELED INLINE GLIDER SKATES WITH HANDBRAKE

TWO-WHEELED INLINE GLIDER SKATES WITH HANDBRAKE

CROSS-REFERENCE TO RELATED APPLICATION

5 This application claims the benefit of U.S. Provisional
Patent Application Serial No. 60/392,966, filed July 2, 2002.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

10 The present invention relates to inline roller skates.
More particularly, the present invention relates to high-
performance two-wheeled inline skates which may optionally have
a hand-operated braking system operating on a rear wheel,
thereof.

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2. DESCRIPTION OF RELATED ART

The use of inline skates has become widespread. There are
drawbacks to the standard four-wheel inline skates due to
limited size of wheels and friction when attempting to obtain
high-speed performance. Known two-wheel inline skates have the

rear wheel extending substantially back of the user's heel, limiting maneuverability. Also, the standard type of rubber stop brakes, which require the tilting of a skate forward or backward for braking against the surface where skating is

5 inadequate since the brake on only one skate can practically be used at one time, and constant brake pressure is difficult to apply. When braking from high speed, braking on both skates is desirable, both to gain braking power available from both skates and to avoid torque developed by braking with only one skate

10 which tends to twist the skater around. Braking on both skates with similar controlled braking pressure would be highly desired when applying to two-wheeled skates.

U.S. Patent No. 2,868,554, issued January 13, 1959, to Ring describes a two-wheel inline roller skate having relatively

15 small wheels, the rear wheel extending substantially to the rear of the user's heel. No brakes are provided in the '554 patent to aid in stopping.

U.S. Patent No. 5,200,409, issued May 18, 1993 describes an inline skate system operated by a Bowden cable and hand lever

20 which presses a brake shoe against the skating surface, thus avoiding tilting the skate back to apply braking pressure.

U.S. Patent No. 4,943,075, issued July 24, 1990, to Gates, describes a combination skate-ski assembly which provides relatively large wheels mounted substantially forward and to the

rear of the user's toe and heel, respectively, and provides for Bowden type cables operated by hand levers and operating on bicycle-type brake actuators. The '075 assembly would necessarily be wide and therefore clumsy to maneuver, particularly at high speeds.

U.S. Patent No. 5,584,491, issued December 17, 1996, to Chronic, Jr. describes an inline roller skate having a remote brake which includes a brake assembly that engages and frictionally engages and retards a rear wheel of the skate and a Bowden cable assembly that extends from the brake assembly and terminates in a hand-held actuating lever assembly.

U.S. Patent No. 5,335,924, issued August 9, 1994, describes a retractable brake pad mechanism for inline skates. One embodiment includes a handle assembly for activating the brake, the pad of which engages the skating surface.

U.S. Patent No. 4,300,781, issued November 17, 1981, describes a roller skate braking system with a hand brake, cable and brake pad.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

SUMMARY OF THE INVENTION

The present invention is a two-wheel high speed glider inline roller skate. The skate has a boot having a toe and a heel portion to which a downward opening channel-shaped wheel support is attached centrally along the length of the boot. The channel has front toe and rear heel mounting plates corresponding to mounting pads riveted to the sole of the boot at its toe and heel, respectively. The channel has a centrally located arched stiffener mounted to and extended between the channel sides and attached to the upper side of the channel for stiffening the channel structure. The channel structure has a toe portion with sidewalls extending downward and forward of the boot toe to receive a front wheel between sidewalls, the wheel being rotated on an axle and mounted to the channel structure by bearings. The axle is spaced substantially below and forward of the boot toe such that the front wheel is located forward of the toe. An upper toe piece extends between the sidewalls of the front portion along the top thereof and extends up to the front intersection of the toe pad and the toe portion of the sole which provides added stiffening and toe control when skating.

The channel-shaped wheel support slopes downward from toe to heel and a rear portion thereof then extends downward at a slightly rearward angle from vertical from about the center of

the heel mounting plate about 1½ inches from the extreme end of the heel. The rear portion receives a rear wheel between its sidewalls, the wheel being rotated on a rear axle and mounted to the channel structure by bearings. The rear axle is preferably
5 located directly below the rear of the plate, positioning the rear wheel substantially directly below the boot heel.

The channel-shaped wheel support has aligned threaded bores through opposite sides of its rear portion, spaced above the rear axle for attachment of an optional brake system acting on
10 the rear wheel at its rear periphery.

The brake system has opposed brake connecting frames attached at their front mounting end by mounting screws to be received by the threaded bores of the channel-shaped wheel support. The brake connecting frames extend horizontally
15 rearward to a brake support end. An upper brake frame brace is substantially inverted "V"-shaped and extends upward from the support end of the brake supports and attached thereto at its open ends as by welding at about a 45-degree angle. A lower brake frame brace is substantially inverted "U"-shaped and
20 extends upward from the support end of the brake supports and attached thereto at its open end as by welding at about a 30-degree angle.

The lower brake frame brace is attached to the brake supports below the upper brake frame brace and extends about

one-half the length of the upper frame brace such that its cross portion is substantially directly below the apex of the "V" portion of the upper brake frame brace. The cross portion of the lower brake frame brace supports a rotating pivot bar. A
5 brake pivot plate is centrally attached to the pivot bar so as to pivot back and forth and support a brake shoe at its lower end. The upper end of the pivot plate is operated by a Bowden type cable and sheath operated by a hand lever operated by the user. The lower end of the sheath is supported by a cable
10 shield connector and stop mounted on the apex of the upper frame brace. The upper portion of the brake pivot plate receives the lower cable end and extends downward between the legs of the upper frame brace to the rotating pivot bar.

Upon pulling the hand lever, the cable is pulled through
15 the shield, thus pulling the upper portion of the brake pivot plate back. As the upper portion of the brake pivot plate is pulled back, the brake shoe mounted on the lower portion of the brake pivot plate is forced forward against the periphery of the rear wheel, thus effecting a braking action. Release of
20 pressure on the hand lever allows a spring, mounted between the brake shoe and the cable shield connector and stop, to retract, pulling the brake shoe away from the rear wheel. The brake system may also be applied to a four-wheel inline skate which is specially designed to receive the brake mounting.

Accordingly, it is a principal object of the invention to provide a high-performance inline roller skate.

It is another object of the invention to provide a roller skate as above which safely obtains high speeds and is
5 maneuverable.

It is a further object of the invention to provide a roller skate as above which operates with minimum friction.

Still another object of the invention is to provide an embodiment of the roller skate as above which has only two
10 inline wheels.

Yet another object of the invention is to provide a roller skate as above which has an attachment for installation of a brake.

Still another object of the invention is to provide a
15 roller skate as above having a hand-operated brake system.

Yet another object of the invention is to provide a roller skate as above wherein the hand-operated brake system includes a brake shoe which may be applied to the rear periphery of the rear wheel to slow or stop the roller skate.

20 It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side elevation view of a two-wheel inline glider skate according to the present invention.

Fig. 2 is a bottom plan view of the skate of Fig. 1.

Fig. 3 is a side elevation view of the skate of Fig. 1 with a handbrake installed.

Fig. 4 is an exploded view of the handbrake of Fig. 3.

Fig. 5 is a side elevation view of a specially designed four-wheel inline skate with the handbrake of Fig. 3.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a two-wheel high speed glider inline roller skate having a channel-like support for a front wheel located downward and forward of the skate toe and a rear wheel located directly below the skate heel. A hand-operated brake is attached to the rear of the skate support having a

brake shoe operating against the rear periphery of the rear wheel. The brake is operated by a hand lever operating on a Bowden type sheath and cable which pulls a pivot plate, forcing the brake shoe against the wheel. A spring returns the brake to the open position once pressure is relieved on the hand lever.

Referring to Figs. 1 and 2 there are shown a side elevation view and a bottom plan view of the two-wheel inline glider skate of the present invention. Two-wheel inline glider skate 10 includes a boot 12 of common construction having a sole having a boot heel pad 14 riveted to the heel portion of the sole and a toe pad 22 riveted to a toe portion 16 extending over toe pad 22. Skate 10 has a generally channel-shaped, downward opening frame 18 having sides 36 and an upper wall 33 attached centrally along the length of boot 12 by means of frame heel attachment plate 20 at boot heel pad 14 and frame toe attachment plate 23 at boot toe pad 22 the attachments being made by nuts and bolts 40 and 38, respectively. The channel structure has a front portion 24 with sidewalls 36 and extending downward and forward of the boot toe to receive front mounted wheel 28 between sidewalls 36 rotating on an axle 30. To reduce friction, the wheel 28 may be mounted on bearings of common construction (not shown) around axle 30.

An upper toe piece 25 extends between the sides 36 of toe portion 24 along the top thereof, extending up from a point near

the periphery of wheel 28 to the front intersection of the toe pad 22 and the toe portion of sole 16, acting as a stiffener and providing added toe control to the frame toe portion 24 and wheel 28. The channel-shaped frame 18 has a centrally located
5 inverted arch stiffener 34 mounted to and extending between the channel sidewalls 36 and attached at each end to upper wall 33 of channel frame 18.

The sidewalls 36 of channel-shaped frame 18 angle downward from toe to heel and a rear portion 26 thereof extends downward
10 at a slightly rearward angle from vertical at a point from about the center of boot heel mounting attachment plate 20 about 1½ inches from the extreme end of the heel. The rear frame heel portion 26 receives the rear mounted wheel 28 between its sidewalls 36 the wheel 28 being mounted for rotation on rear
15 axle 30 by means of bearings(not shown). The rear axle is preferably spaced directly below the rear end of attachment plate 20 such that the rear wheel is directly below the heel of the boot. The channel-shaped wheel support has aligned threaded bores 27 through opposite sides of its rear portion, spaced
20 above the rear axle 30 for attachment of an optional heel brake assembly 42 (see Figs 3 and 4) acting on the rear periphery of the rear mounted wheel 28.

Referring to Figs. 3 and 4, there are shown a side elevation view of the inventive two-wheel inline glider skate

with a brake system attached, and an exploded view of the brake system. The brake system includes heel brake assembly 42 and hand grip brake control assembly 44 connected by a Bowden type brake activating cable and sheath 58. Hand grip brake control assembly 44 resembles a hand grip and brake lever assembly of a bicycle handlebar and includes grip handle 46 having handle clip 47 attached thereto for clipping the assembly 44 to a skater's waist belt. Hand held brake control body 48 is connected at one end of grip handle 46 and is tightened around a common central tube(not shown) by body tightening bolt 50. Hand lever 52 is connected with body 48 by pivot connection 53 so as to allow hand lever 52 to be squeezed inward toward handle 46 when applying the brake. The activating cable grip end of cable and sheath 58 is attached to the hand lever 52 near its connection with body 48 at hand lever connection 54 and enters the sheath at hand held brake body cable sheath connector and stop 56.

The cable and sheath 58 extends to a lower end where sheath protector 60 encases the lower portion of sheath 58 for protection. A sheath ferrule 62 is located at the lower end of the sheath 58. A sheath connector ferrule receptor 64 receives the lower end of ferrule 62 where it is connected with sheath connector actuator cable guide 66 through which the lower portion of actuator cable 68 may travel. The actuator cable has

an adjustment fastener 70 attached near its lower end to adjust its length relative to the heel mounted brake assembly 42.

The heel mounted brake assembly 42 includes opposing brake connecting frames 72 attached at their front mounting end by mounting screws 74 which attach at brake frame attachment threaded bores 27 (see Fig. 1) in frame 18. The brake connecting frames 72 extend horizontally rearward to a brake support end where upper brake frame brace 76 and lower brake frame brace 78 are attached therebetween as by welding, thus bridging the gap between brake connecting frames 72. Upper brake frame brace 76 is substantially inverted "V"-shaped and extends upward from the support ends of the brake supports, extending upward rearwardly at about a 45-degree angle, its open ends being attached to the brake supports. A lower brake frame brace 78 is inverted flattened "U"-shaped and extends upward rearwardly from the support end of brake supports 72 at about a 30-degree angle, its open ends being attached to the brake supports.

The lower brake frame brace 78 is attached to the brake supports 72 below the upper brake frame brace 76 and extends about one-half the length of the upper frame brace 76 such that its cross portion is substantially directly below the "V" portion of the upper brake frame brace 76. The cross portion of the lower frame brace 78 supports a rotating pivot bar 94 by means of pivot bar journals 96 located at either end of the

cross portion of lower frame brace 78 and extend upwardly and rearwardly therefrom so that pivot bar 94 is spaced from the lower frame brace cross portion. An elongated brake pivot plate 81 includes a rearwardly curved lower portion 82, a planar central portion 84 and an upwardly curved upper portion 85 interconnected as by welding and is perpendicularly mounted at its central portion 84 to pivot bar 94 as by welding so as to freely pivot back and forth therewith.

The lower end of lower curved portion 82 of the pivot plate 81 contains a bore 83 near its extreme end for mounting a brake pad 86 thereto by means of brake pad stud 88 extending rearwardly from brake pad 86. Brake pad stud 88 is inserted through bore 83 and secured by a stud nut 90. Brake pad 86 is generally block-shaped, having a braking surface opposite the mounting surface of brake pad stud 88 and having upper and lower surfaces tapering inward from the braking surface to the mounting surface.

The upper end portion 85 of the pivot plate 81 has a throughbore 92 near its extreme end for receiving the lower end of cable 68, the adjustment fastener 70 being secured to cable 68 so as to maintain the end of cable 68 forward of pivot plate 81 and being adjustable along the lower end of cable 68. The upper portion of upper brake frame brace 76 including the apex of the "V" portion is preferably bent forward at an angle past

the vertical. Cable sheath connector and stop 80 is attached to the upper "V" end of upper brake frame brace 76 as by welding and extends upward and forward in line with the bent portion thereof. Cable sheath connector and stop 80 is in the general shape of a machine nut and engages ferrule 62, connector ferrule receptor 64 and receives the lower end of sheath 58, thus acting as a receiver and stop for the lower end of sheath 58, allowing cable 68 to move inward and outward relative thereto. A return spring 98 has an upper hook end 100 and a lower hook end 102.

The upper hook end 100 is attached between cable sheath connector and stop 80 and sheath connector ferrule receptor 64. The lower hook end 102 is attached around stud 88 and held between brake pad 86 and nut 90, or, alternatively, is welded to the exposed end of stud 88.

Referring to Fig. 5, there is shown a four-wheel version of the inventive inline skate with the heel mounted brake assembly of Figs. 3 and 4 attached to a four-wheel generally channel-shaped support frame 118 having a toe portion 124 and a heel portion 126 bearing front and rear wheels 28. Frame 118 includes intermediate wheel supports 128 bearing intermediate wheels 28.

In operation, a skater carries the hand brake assembly on a waist belt using handle clip 47. When the skater wishes to reduce speed or stop, he grasps hand brake assembly 44 and

squeezes lever 52 toward handle 46. This action pulls actuator cable 68 through sheath 58 which pulls actuator cable adjustment fastener 70 against the upper pivot plate portion 85. This causes pivot plate 81 to pivot on pivot bar 96, thus causing lower pivot plate portion 82 to rotate forward, applying brake pad 86 against the rear periphery of the turning rear wheel 28 while expanding return spring 98. The degree of braking is determined by the squeezing force applied to lever 52. Upon easing or release of squeezing force applied to lever 52 by the skater, return spring 98 reduces braking friction of brake pad 86 against the rear wheel 28 or pulls brake pad 86 away from wheel 12 to a free-skating position.

The wheels 28 are preferably plastic and are available in a range of sizes. The preferred wheels are about 90 millimeters in diameters and the sized used may vary from about 80 millimeters in diameter to about 90 millimeters in diameter. It has been demonstrated that a 90-millimeter wheel provides the best overall performance in speed and control.

In the two-wheel version it is desirable to position the rear wheel vertically below the heel of the boot while the front wheel is extended forward of the toe. This configuration reduces weight on the front wheel which enhances overall speed and control of the skate and increases weight on the rear wheel allowing more effective push-off for faster takeoffs and

acceleration while increasing maneuverability. This configuration also allows the brake system to be more compactly attached. The configuration of the brake pivot plate results in a more compact brake assembly.

5 The boot is preferably plastic while the frame and attachment plates are made of metal. The brake assemblies are made of plastic, rubber, and steel as appropriate.

10 It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.